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NUMBER 1,
OCCASIONAL PAPERS,
ENGINEER SCHOOL,
UNITED STATES ARMY.

IMPRESSIONS *of* A COMPANY COMMANDER

By
LE CAPITAINE BREVETÉ DU GÉNIE POTEZ

Translated from *Revue du Genie
Militaire*, July-August, 1901, by
CAPTAIN J. R. WILLIAMS
Artillery Corps, U. S. Army
CAPTAIN F. R. SHUNK
Corps of Engineers, U. S. Army
1ST LIEUT. E. M. RHETT
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REVISED EDITION

WASHINGTON BARRACKS, D. C.,
PRESS OF THE ENGINEER SCHOOL,
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BUREAU OF COAST AND GEODETIC SURVEY

PREFACE.

The object of the present essay is not a general study comprising all the details of command, instruction and administration in an Engineer company. We desire merely to convey to our young comrades, who may be called upon to exercise the important functions of company commander, certain observations that our personal experience has suggested, and that may be of use to them in the exercise of their command.

We have been obliged to enter into a few considerations of a rather general character. At the present time, the regiments of Engineers are passing through a true period of transition. Although instruction in the "Schools" has been a thing of the past for several years, yet the instruction by company is not universally practiced. The result is that our company commanders do not always enjoy the initiative that they should have, and that some of our methods of instruction, although conforming to the regulations, may still be regarded as experimental. Thus we have been induced to discuss the conditions under which the command of an Engineer company should be exercised, as well as such modifications in the present methods of instruction should be rationally introduced.

We have deliberately left out everything that relates to the general organization of the arm. Taking the troops as they are, we have striven merely to discover the best methods to be employed with a view to their preparation for war.

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IMPRESSIONS OF A COMPANY COMMANDER.

PART I.

INTRODUCTION.

The company, troop or battery constitutes a unit of command, the effective strength of which is sufficiently small to enable its chief to know all his subordinates intimately, and at the same time sufficiently large to require that its command should be entrusted to an officer whose rank and experience will enable him to regulate all the details of the command, instruction and administration of his unit.

The importance that is attached to the office of company, troop, or battery commander, even in the regulations, is thus easily understood. This applies evidently to the Engineers as well as to the other arms of the service.

What is, or rather what should be, a company commander, in a regiment of Engineers?

On mobilization, and even during the autumn maneuvers, the captains commanding Engineer companies become, for the most part, on a small scale, chiefs of separate units. While those commanding the companies attached to army corps are subordinate to the Chief Engineers of the army corps, those commanding the divisional companies,*

*In each of the 20 army corps in the French Army there is a corresponding battalion of Engineers which has the same number, and which joins its army corps in case of mobilization.

This battalion furnishes one company to each division of infantry, and one company to the headquarters of the army corps.

The 4th companies of battalions would be attached to the large engineer parks of armies or be employed in the fortresses.

In time of peace the battalions of Engineers are concentrated at the regimental headquarters, which are as follows:

1st and 5th regiments, Versailles; 2d, Montpellier; 3d, Arras; 4th, Grenoble; 6th, Angers; and 7th, Avignon.

which are in the greater number, are directly under the orders of the Division Commander. Although the number of men under their orders is inconsiderable, yet, the salvation of the division to which they are attached, or the success of the operations, may depend on the manner in which they execute the mission intrusted to them. This will be the case, for example, when the company is charged with rapidly preparing for the passage of a stream that the division must cross, either to march upon the enemy or to escape his grasp; or, in a retreat, when it is a question of destroying some structure necessary to the enemy's pursuit. On the battlefield orders will not always arrive in time, and officers of Engineers will often be obliged to utilize, on their own responsibility, the resources at their disposal, in order to provide for the passage of a stream, to create hasty points of support, etc.

These officers should possess, therefore, in addition to a thoroughly developed professional education, a vigilant spirit of initiative, and a decision of character that will permit them to act without hesitation when the circumstances require it. These qualities are even more necessary in the Engineers than in the other branches of the service, with the exception of the cavalry; for in the other branches superior officers are at hand to rectify the mistakes committed, or to direct personally those subordinates who appear to be going wrong.

It appears evident, therefore, that the company commanders in the Engineer regiments should enjoy the greatest latitude in the command and instruction of their units. In addition to the certain benefit to the discipline and instruction of the men that results from such independence, it is unquestionably the best means of developing in the officers themselves, the spirit of initiative, decision, and professional knowledge.

If, however, we examine the facts of the case, we find that the introduction of new ideas, in regard to command and instruction, appears to be more difficult in the Engineers than elsewhere.

As regards instruction, this may result partially from the fact that, although the "School" no longer has charge of the instruction of the troops, yet there remains in the regiments, no doubt on account of tradition, a tendency to centralize excessively everything pertaining to instruction.

In the eyes of certain officers such a method in command and instruction is justified by the two following considerations:

- (1) As the technical instruction necessitates the employment of

material which is common to the whole regiment, it is necessary to place the various portions of this material at the disposal of each of the companies in succession, and on this account to limit each to a stipulated time.

(2) The majority of officers of Engineers pass the greater part of their career in the special staff of the army. When they return to the regiment, they must post themselves on the methods of instruction, which may be new to them, and they must also reacquire soldierly habits. As some inexperience on their part is to be feared, it is thought necessary to maintain a close supervision over their action in the exercise of command and in the instruction of their men.

Doubtless the distribution of the material among the companies compels some restriction as to the employment of time, but it does not seem necessary to go as far as is generally done, by dividing the area of the polygon into as many "trenches" as there are different schools, and by devoting the same number of drills in each company to the same kind of work.

There are many causes which prevent all the companies from conveniently employing their time in an identical manner. One of the most frequent of these arises from periods of bad weather, which, occurring during the whole or a part of the time allowed for a "School," make a certain number of supplementary drills indispensable. It is impossible to conduct these if such a system is employed.

Again, the individual members of the company do not require the same amount of drill in the various schools of instruction. Take for example a company which has received in its contingent of recruits a number of quarrymen, excavators, or miners, who are, on account of their trade, perfectly familiar with the various kinds of earth work. As we shall show later, the training of the sapper in this kind of work must be considered as an essential part of his instruction. It is, therefore, logical to divide the company into two parts. The first will include the men who, before their enlistment, were skilled in handling the pick and shovel. It is sufficient to teach these men the posting of the workmen, the distribution of the tools, and the trace and profile of the various trenches in the regulations, and to have them throw up once or twice each style of intrenchment. The second part will include those men who have never touched a shovel or pick before their arrival in the regiment, and who must be subjected to methodical training. These will take

part, of course, in the exercises of the whole company in battle formation, but the greater part of their instruction will consist of a number of progressive drills in excavation, to harden and train the muscles of the weaker and clumsier men. Those who are excavators by trade, and who would derive no benefit whatever from these exercises, will employ their time more usefully in other portions of the course of instruction. In case of necessity, they may be even employed on the details of guard and fatigue on those particular days in order to permit those that are most greatly in need of it to be present at the excavation exercises.

As each captain is best acquainted with the progress of his company in the various drills, and with the special aptitude of his subordinates, he should be required only to complete the various portions of the course of instruction within the time fixed by the commanding officer. The division of the time should be regulated by him, under the supervision of his battalion commander. Each battalion should be allotted the different classes of material, between certain dates. The battalion commander should, in turn, place various portions of this material at the disposal of captains, for stipulated periods. The number of hours that the company commanders would devote to each kind of drill would not be obligatory. There would be a limit to the time that he could devote to each, but if the men were sufficiently instructed in less time he would not be required to continue the drill for a longer period. He would in such cases report the progress of his company to the battalion commander, who would authorize him to employ the remainder of the time in drills which had been taken up previously, but in which his company was not sufficiently instructed; or, if the necessary material for such drills were not available, in field exercises, too many of which can never be conducted.

Let us now examine the argument in regard to the inexperience of the officers, and see what conclusions may be drawn from it.

It is certain that a captain returning to the regiment after eight or ten years' service in the special staff will find many changes in the drill regulations, and in technical instruction and administration. He must therefore learn many things over again and may be expected, at first, to show some hesitation in the execution of his duties.

Thus "brushing up" is necessary. It should be facilitated in every way, in order that it may be speedily and completely attained. The most efficacious means to this end, surely, is to give the officer all the initiative compatible with his position. If he makes mistakes, his

superiors are at hand to correct them before grave consequences result. To restrict an officer in his responsibility and to deprive him of initiative, can only defeat the end to be attained. Such a course is no more than a palliative. It can do no more than produce a dangerous stage effect, by allowing the regiment to present a good appearance at inspection, without the training and discipline necessary for service in the field. The truly important point is to secure efficient command of the companies when the new men received at mobilization have broken the correct alignment of the barrack yard, and when they have left the orderly rooms and offices of the garrison, and are scattered in the fortifications, and in the army corps and divisions. What cohesion and discipline will these companies have if their captains have been deprived of active and full command?

Should we suppose that after they have devoted their time to a serious study of the regulations, and after they have received from their commanding officers precise but broad instructions, indicating to them the object to be attained, the time to be employed for that purpose, and if necessary the main outlines of the methods to be followed—should we suppose that the majority of Engineer officers are unequal to making excellent Engineers, capable of doing credit to their companies and regiments out of the men that the annual conscription places in their hands? The contrary is certainly the case. If from the standpoint of military routine, we have observed a few sins of omission in some who are excellent officers in other respects, such a condition results partly, no doubt, from the multiplicity of their duties, but chiefly from the fact that, during their service with their regiments, their opportunities for acting on their own responsibility have been by far too few.

We repeat therefore, that in order to develop in our Engineer company commanders both the professional knowledge and the decision of character necessary in the field, the only proper method is to give them in peace the greatest possible responsibility in the command and instruction of their companies.

More than once in this essay we shall be brought back to the fact that in time of war the majority of the company commanders of Engineer troops must, in technical matters, act on their own initiative. They must therefore, in time of peace, be trained to depend on their own resources. In our opinion this is the controlling idea which should govern their preparation for war.

Besides, it is very clear that it is out of the question to pursue a

uniform course with regard to all officers. If, along with company commanders who are vigorous, intelligent and progressive, there may be found some rather below the mark, it is the duty of their immediate superiors, their battalion commanders, to guard against the disadvantages resulting from any failings in their subordinates, and, if possible, to eliminate the failings, or at least to diminish them. Thus they will guide with a tighter rein those who betray too much inexperience. They will stimulate those who err through laxity. Such is in our opinion, the essential functions of the battalion commanders of Engineer regiments, the battalions of which do not exist as war units, as they must distribute their companies on mobilization among the fortifications and the army corps and divisions.

COMMAND.

DISCIPLINE.

“Discipline is a virtue which impels us to carry into effect the intentions of our chief, through a sense of duty and of the general welfare, by devoting to this end the whole physical, moral and intellectual energy of which we are capable.”*

Discipline, as it should be understood in modern armies, seems to be very precisely defined in this sentence.

What are the means that will enable us to obtain it; and first of all, what *role*, and how much importance should be assigned to punishments?

Always more or less humiliating for those who undergo them, measures of severity can neither inspire nor develop that active devotion for one's immediate chief, which is the essence of discipline as just defined. Punishments may prevent the commission of offences, but are powerless to implant the desire to do well,—which is the essential aim of our efforts.

Punishments, in our opinion, are included for the greater part in two distinct classes, corresponding to entirely different necessities. Firstly, there are light punishments, such as extra fatigue, or one or two days' confinement, which provide a means for “breaking in” a recruit and enable us to stimulate indolent natures, inclined through laxity to neglect part of their duty. Secondly, there are the more rigorous measures, including transfer to the disciplinary companies, and trial by court martial, which are necessary in the case of those

*“Infantry,” by General Bounal.

refractionary individuals who have failed to respond to all appeals to their good sentiments, and whose grave and repeated offences must be the object of stern repression.

With these exceptions, punishments may and should be reduced to a minimum, for it is very often expedient to show indulgence to men who, ordinarily perfectly amenable to discipline, have yielded to some short lived weakness.

Herein lies precisely one of the greatest means of action of the company commander, and in this connection, nothing is more detrimental than the *schedules* of punishments which commanding officers feel called upon to impose.

In such matters the tact and experience of each company commander are the best guides. We think it our duty, however, to formulate the few following remarks, which may be useful to young officers.

When one allows any offense whatsoever to pass unpunished, it is nevertheless essential to take notice of it, often by but a simple sign, without which the delinquent might think himself permitted to do the same thing again, or would conclude that his chief had not noticed it; facts which, in the long run, would be damaging to the officers authority. This observation must be made, should the case occur, in terms to make the man understand clearly, that if he is not punished, it is on account of his habitual good conduct, and because it is considered an offense that will never be repeated. Such a method applied with tact, will often contribute more than a punishment to the better discipline of the soldier, by attaching him more firmly to his chief.

The only way to obtain a faithful performance of duty is to make the men thoroughly understand what is required of them and to exercise close supervision over all details during their first days of service. This principle, so evidently necessary that it may appear useless to formulate it, is nevertheless very frequently neglected. Directions are given incompletely, without the superior's making sure that they have been fully understood, or are even not given at all, and the man is punished because they are unexecuted or executed badly. Or again, after orders are properly given and well understood, supervision is not exercised, men relax little by little, and at last become utterly neglectful. Punishments rain down upon the delinquents, but it is too late; the evil bent is formed, and the greatest culprits are the chiefs, who have taken no notice of the first slips, as might have been done by simple observations. This explains why the best disciplined

organizations are generally those in which punishments are the least.

These considerations are of supreme importance in the training of recruits during the period immediately subsequent to their enlistment. We shall have occasion later to recur to this matter, in speaking of the arrival of young recruits in the company.

It is therefore unquestionable that punishments, considered as a necessary evil, play only a secondary part in the establishment and maintenance of discipline as it should be understood. The essential elements which contribute to discipline, correspond to three different classes of ideas.

- (a) *The ability of both officers and soldiers*, the consciousness of which gives the man confidence in his superiors, in his comrades, and in himself.
- (b) *Moral education*, to develop in the soldier patriotism, devotion to the flag, and the sense of duty.
- (c) *The solicitude of the officer for the material and moral welfare of his men.*

Let us examine these in succession.

(a) *The ability of both officers and soldiers.*—The soldier, to be truly the instrument of his chief, must be conscious of a superiority in the latter, making him worthy in all respects of the authority with which he is vested. An inefficient officer may by the means of punishments command the obedience of his men, but will never have their confidence. Young officers should be thoroughly convinced that, by developing their professional ability, they will not only qualify themselves the better for the proper exercise of the functions of their grade, but will also greatly increase their control over their subordinates.

But it is not only the instruction of the officers that is important from this standpoint; the instruction of the men, down to the lowest private, when it is well executed, induces reciprocal confidence among all the elements of the unit. The moral worth of each individual soldier produces the same effect. From this confidence of all with regard to all, there results a firm cohesion, which forms the most invaluable of qualities for a company in the field.

From these qualities also springs the *esprit de corps*, an excellent thing in itself, provided that it be not exaggerated, and that the consciousness of the merits of one's own arm be not combined with a scorn for all others. The consequences of such a condition may be, as is unfortunately sometimes the case, that soldiers who are entirely devoted to their own officers show themselves much less disciplined

when they are placed, either alone or in small parties, under the orders of officers of other arms.

The comradeship of arms, which within a few years has made such great progress in our corps of officers, should, to receive its full development, extend to the men. Even more, perhaps, than for the soldier of other arms, this quality is necessary for Engineers, summoned as they often are, in small detachments, to aid troops of other arms. Moral education, tending to develop in the man the most lofty sentiments, permit us to impress upon the soldier the necessity for mutual devotion in all ranks of the army; and from this point of view its most useful complement will be found in grand and garrison manoeuvres, and in general in all opportunities which should be made as numerous as possible, for combined operations of Engineer troops with detachments of other arms.

(b) *Moral education.*—The daily routine of duty furnishes the captain with the means of acting, to a certain extent, upon the moral well-being of his subordinates. But this educational function should not be confined to these limits. It is not enough, indeed to limber and strengthen the body of the soldier; to teach him to handle the arms and tools he will use in war; to obtain precision in the execution of the daily routine in time of peace; it is also and especially necessary, as far as the nature of each individual will admit, to develop in him moral qualities of the very highest order, the absolute devotion to the fatherland and to his flag, and the spirit of abnegation which impels the soldier to sacrifice his life without hesitation when the interests of his country require.

To this end the captain will assemble the whole company from time to time, and will endeavor to impress upon his men the nature and importance of their duty to their country. Some officers hesitate to do this, believing that they are not gifted with sufficient fluency of speech. Let such men lay aside all apprehension. It is not a question of delivering a philosophical dissertation, for this would be incomprehensible to a majority of the men. In the midst of Europe in arms, the necessity, more imperative than ever at the present day, for the complete devotion of every Frenchman to his country should be briefly discussed, and an elementary history of France, and especially of our own times, should be given to the soldier,—facts which will indicate our probable enemies, which will remind him how Germany prepared and conducted the War of 1870, and which will impress upon him the obligation for all Frenchmen, if they are unwilling to

fall into decadence, to reëstablish some day the integrity of the territory of the fatherland.

No abstractions should be indulged in during these familiar conversations; the anniversary of a battle taken part in by the company, an act of devotion performed by some soldier of the regiment, in a general way every incident supplying a theme for an excursion which may touch the heart and imagination of the soldier, will give the captain opportunity for a brief discussion, in which the lesson or example to be drawn by each man will be made plain. It is not necessary to be an orator to do this. In such matters the officer has only to let his heart speak; this will be his surest way of touching the hearts of his men. Let those officers try it who have not thought it their duty hitherto to employ this method of education. To be convinced of its efficacy, it will be enough to see the faces of the men listening to their captain, when he is explaining one of those questions which mean life or death, or at least incontestable greatness or a irreparable decadence, to a great nation like France.

(c) *The material and moral welfare of the soldier.*—The regulations prescribe that all officers, of all grades whatsoever, shall take the most solicitious concern in everything connected with the material needs of the soldier. In the absence of any other reason, these instructions would be justified by the evident fact that the physical effort that may be demanded of the man, and his resistance to all kinds of fatigue, bear a direct ratio to the extent to which the body is maintained in vigor and health. But this material result is not the only one obtained by an officer truly anxious for the welfare of his subordinates. It is clear, indeed, that since the physical reacts upon the moral being, the later will be so much the better for the soldier's more vigorous and healthy condition; but there is another consequence equally deserving our attention. The feeling that his chief is concerned in his welfare exerts an excellent influence on the man's state of mind; nothing is more depressing to a company on the contrary than to perceive that its commanding officer lacks interest in its material needs.

The moral welfare of the soldier demands equally our care. To make the recruit, unaccustomed to the new element in which he has to live, feel on all sides the sympathy of his chiefs and of his comrades; to take care that the non-commissioned officers show moderation as well as firmness in the exercise of their authority; to repress extravagant language and harsh words, which merely irritate the victims against their superiors; and in general, to spare the soldier every

useless shock—all these contribute to the establishment of good discipline, and ensure the officers not only the respect and obedience, but also the sympathy of their subordinates. A mark of solicitude, a cheap attention for the officer who gives it, often ensures the deep attachment of the soldier concerned, during his whole service, and in years to come. It may be a favor to a man on the way to a sick parent, a visit to the hospital or to the infirmary, or even less, some mere trifle, but to the soldier it is proof that his chief takes an interest in him.

OFFICERS.

A very interesting and sometimes a very delicate part of the functions of the company commander is his conduct toward his subaltern officers.

A young officer graduates from Fontainebleau or Versailles; he joins the regiment with a good theoretical education, but is lacking the practical part of his profession. In order to become a good company officer, with all the authority that comes from sterling professional merit and a profound knowledge of men, he has much experience to gain. The importance, therefore, of his first impressions and the great influence of his first immediate chief, his first company commander, may be readily conceived. The greatest concern for his lieutenants, and particularly for the recent graduates, the first steps of whose official career he should guide with all possible solicitude and tact, should therefore be an essential duty of the captain.

Doubtless the captain is not and should not be the only officer to direct and instruct the lieutenants under him; the field officers and the colonel especially, participate to a great and even a preponderating extent. We often hear, "Like colonel, like regiment," which amounts to saying, from our present point of view "Like colonel, like corps of officers." Now the young lieutenant is easily affected by the new environment in which he is called to live. But although thus limited, the captain's task is important enough to demand his care.

We have striven to prove that the greatest initiative possible should be left to the company commander; the same principle will guide this officer in his dealings with his subordinates and especially with his lieutenants.

Of course the degree of initiative left to the latter should be carefully proportioned to their degree of experience; however, unless

the incompetency of an officer is apparent, a company commander should be guided by the two following rules:

- (a) To reduce orders and instructions to the least strictly necessary, and for this reason, never to prescribe details that can be regulated by a lieutenant.
- (b) Orders once given, to interfere in the execution thereof only if he foresees that the subordinate will fail to accomplish his object. If the result of the first measures taken will be merely a waste of time or some similar inconvenience, the captain should allow him to continue the course adopted. When the work or exercise is finished, he will explain to the officer that another method would have effected a saving of time, of personnel or material. The lesson will thus be much more profitable.

This rule does not apply, of course, when the company is taking part in combined maneuvers.

When the captain makes a decision of importance in regard to the discipline, instruction, or administration of the company, it will generally be advantageous to acquaint his lieutenants with the reasons which have influenced him in making it. By taking this course, not only will he qualify them for their service as company commanders, but he will post them thoroughly as to his views on various matters of duty. In this way he obtains the invaluable result that, if he is absent or not available, these officers will act, if not exactly as he himself would have acted, at least in a manner generally conformable to his intentions.

The performance of duty is more precise and enthusiastic as it is easier and more agreeable, and a captain who endeavors to spare his lieutenants useless drudgery may on this account be more exacting in the various duties that result in useful ends.

We may add, that a captain really worthy of the functions devolving upon him will find it profitable to treat his subalterns as comrades. The captains who keep their lieutenants at a distance are often officers, who, conscious of their inferiority, fear to compromise their authority by allowing their subordinates to become too well acquainted with them. Such captains are only to be pitied; but those who for any other reason think it their duty to act in such a manner will surely gain by changing their methods. If their subordinates are taken further into their confidence, they will acquire more assurance in the routine of duty; the ideas and intentions of the chief being well known to all, duties will be performed more readily, without any of

the friction that too frequently occurs in the units where cohesion is lacking, because the chiefs have been unable to establish unrestrained relations with their subordinates.

It is hardly necessary to say that the captain's good example, the most scrupulous precision on his part in the performance of every duty, is the best means at his disposal to impress the sense of duty vividly upon his young subalterns.

The instruction proper, of his lieutenants, should consist almost entirely of practical exercises, and the daily routine is from this stand-point the best of schools. There is, however, a portion of this instruction to which we think we should draw attention, for it is generally, in our opinion, not sufficiently developed. This is a knowledge of other arms and of general tactics. Everybody agrees that whether an officer belongs to the infantry, cavalry, artillery or Engineers, he is but half formed if he is insufficiently acquainted with the other arms. This knowledge is required on account of the aid that the various elements of the army should give each other on the battlefield.

It must be observed that, except in the rare cases where they are utilized as infantry, the mission of Engineer troops in battle always consists in preparing or facilitating the action of one or several of the other arms. On the other hand, during an action, as we shall see later in speaking of technical instruction, Engineer officers should be at all times able to grasp the situation, in order to seize without hesitation the opportunities that enable them to employ, on their own initiative, the personnel under their orders. We may conclude from these two considerations, especially if we bear in mind that no intermediary exists between the division commander and the captain of the divisional Engineer company, that, of all arms, the Engineers stand most in need of thorough instruction, both as regards tactics in general, and the special tactics of each arm and particularly of the infantry and artillery.

Besides, if we may judge from what happens ordinarily during grand maneuvers, the captain of the divisional company will as a rule accompany the division commander in the field, and the company may be left in command of a low ranking lieutenant. This will cause no great trouble as long as the company has nothing to do but to march in its place in the column. But if an action becomes imminent, and the captain has been sent on a reconnaissance or is prevented by some other reason from immediately rejoining his

company, the task of guiding the company in the midst of troops of all arms, and of making important decisions on points that come up from time to time, will fall on the lieutenant.

One can not, therefore, begin too soon to develop practically, as far as possible, the tactical instruction of young officers. Reconnaissances, exercises on the map with both sides represented, maneuvers of all sorts, will, for this reason be of the greatest profit to them.

THE NON-COMMISSIONED OFFICERS.

The part played by the sergeants of a company is of great importance. They are the indispensable auxiliaries of the officers in all the details of military duty, and its proper execution is thus dependent, in great part, on their efficiency.

In permanent contact with the men, they exercise an immediate influence over them; their *esprit de corps*, and their manner of performing their duty, has consequently, a considerable effect on the company as a whole, and the greatest care of the captain should be to have a good body of non-commissioned officers. The adoption of the three-year service, by bringing about a much more frequent renewal of this grade, has rendered the task of the company commander much more difficult. Formerly, when the five-year service was in force, each year, at the release of a class, about one-third of the non-coms were lost. Those who remained maintained the traditions, and the newly promoted men formed themselves, so to speak, on their older comrades. It is no longer the same. Each year, in September, the companies have their staff of sergeants entirely renewed, with the exception of the first sergeant and one, or rarely, two reenlisted sergeants, with also possibly a sergeant who was not discharged, having been promoted to this grade before two years service, or one from the men enlisted for four years. The sergeants coming under these last two heads are not numerous in Engineer regiments. The new sergeants are imbued with a spirit and bring into the company habits which are not those of their new surroundings. This system brings about critical periods which should demand all the attention of the captain.

One way of reducing this inconvenience, is to require that a man who has served in the company as a corporal be assigned to it as a sergeant. By taking care in the selection, one will thus have, with the reenlisted men who generally remain, a nucleus that will greatly facilitate the breaking in of the newly promoted men from other companies.

It is also very advantageous in this connection—but this is the colonel's business—to see that the vacancies among the sergeants which are produced at the release of the class, are not all filled at once; but by means of two separate promotions, one at the end of September, the other a few days before the arrival of the recruits.

Upon receiving his new sergeants, the captain should explain clearly the way in which he desires their duties performed. It is erroneous to believe that the regulations indicate the duties of each grade so clearly as to dispense with this. The young sergeants need a guide. It is also clear, that in a company, all those who exercise any authority whatever, should do so in conformity with the views of the captain, and it would be improper, from this standpoint, to leave the new sergeants to their own devices.

It is especially necessary to make them understand properly, from the day of their arrival in the company, that the actual execution of the details of the military duty rests almost exclusively on them, and to inspire in them the greatest horror of lying, a vice unworthy of a soldier whatever his grade, and one to be combatted by every possible means. In return they should be shown such confidence as will raise them in their own estimation. They will thus acquire, of themselves, the habit of doing their duty conscientiously even in the absence of their officers, and under circumstances which render the detection of wrong-doing impossible. A few remarks of interest, properly shown, will succeed in making of the new sergeants subordinates who are entirely devoted to their captain. Let there be added to this a discreet supervision, at first, of the details of their duties and a firm yet kindly correction of the usual trifling failings; and you will have at the end of two or three months sergeants who, with few exceptions, will be entirely competent in the performance of the duties which have devolved upon them, and valuable assistants to their officers.

Officers will, of course, never intrude upon the just authority of their sergeants. The attention of the lieutenants should be specially called to this point. On the contrary, in proportion as they acquire experience, the sergeants will be left more and more to themselves and will be intrusted with tasks a little beyond those which properly belong to their grade; the double advantage will thus be obtained of giving them greater prestige in the eyes of the company and preparing them to replace their officers in case of need.

It must be recognized that many captains who complain of the inefficiency of their sergeants have only to examine their own

consciences. If they had not neglected the instruction of the sergeants at first, and had not waited until the effects of the bad habits were felt before interfering to correct them, but, on the contrary, had seized every occasion to develop the self-reliance and initiative of these men, they would find that their indifferent sergeants would have made very fit non-commissioned officers. Their restricted length of service does not certainly facilitate the task of the company commander, but this is the more reason for devoting every care to it. The way in which the sergeants perform their duties depends upon the manner in which they have been brought up by their captain; and it may truly be said that the quality of the sergeants of a company and the spirit which animates them is the true test of the ability of the officer in command.

THE CORPORALS.

Although low in rank, the grade of corporal is none the less one of the most difficult to fill properly. The corporal has not had ordinarily, enough experience, to teach it to his subordinates. The life in common with the latter leads almost necessarily to a familiarity that is not conducive to increasing his authority. It may even be said that a corporal depends, to a certain extent, on the men of his squad, for, as his duties are numerous, he is often obliged to appeal to their good-will to prepare his accoutrements, clean his arms, etc. In addition it sometimes unfortunately happens that the corporal may get into difficulty with the sergeants, and may find that instead of aiding him in the performance of his duty they are shouldering on him a part of theirs. One may easily appreciate, therefore, how thankless the duties of the corporal may be. In some cases his duties are laborious; he is responsible to many superiors, and, in spite of his best efforts, he does not succeed in satisfying all.

The captain has, therefore, many reasons for being very solicitous in regard to his corporals. He should aid them in their inexperience by his advice, supervise as closely as possible the discipline of the squads, and facilitate them in the performance of their duties as far as lies in his power. As almost all of them are destined to become sergeants, he will attach the greatest importance to their military and technical training.

This question of promotion from the lower grades leads us to say a word concerning the special "platoons of instruction" which are still in use in the Engineer regiments. A few days after joining, the

recruits are examined in the companies with regard to primary instruction, where they are given a dictation exercise and two or three problems; those who come out the best are nominated for the "platoon of special instruction." We may remark that this assignment is made solely in accordance with the results of the primary examination as the men have been in the service too short a time for their captain to be able to appreciate them from any other standpoint.

From this time on they are practically out of the company. If, in some cases, their theoretical training may be improved by this course of instruction, their practical and military training certainly suffers.

Those who are not extraordinarily awkward at drill, or of notoriously bad conduct, or who have not a particularly poor memory complete the course in the instructional platoon without mishap. Each is then given his relative number, depending principally on the facility with which he has learned the "letter of the theory."

With rare exceptions, promotions of the "candidates" to the grade of corporal are made in the order of their arrangement in the platoon of instruction.

The result of this system is that the candidates are selected for instruction, classified in the platoon, and finally promoted, all according to their facility in memorizing theoretical instruction. We need not point out the fact that such a system is not the one to secure practical results.

What precedes, applies to the instructional platoon of the candidates for corporals. The same difficulties are found in that of the lance sergeants; with this extenuation however, that as the non-coms who form part of it have had some service, it is possible to know more of their military qualities. Nevertheless, here again memory plays the principal part. The conclusion must be reached that the candidates for corporals and sergeants should be instructed with their companies in the same manner as the other men. There is, besides, no reason why the system that is recognized by the most competent military authorities as the best for infantry should not also be best for the Engineers. Last of all, it may be stated that we have never seen instructional platoons organized except for military instruction, properly so called, everything that relates to technical works being taught in the company to all the men whether they are, or are not to receive advancement.

The almost necessary result of instructing candidates for corporals and sergeants in their own company is that they are promoted in their own organization. It has been said that the result of this course

might be that occasionally, at least, some of the non-commissioned officers would not have enough authority over their former comrades.

This difficulty should not be exaggerated. When it exists, it is more than balanced by several advantages. In the first place, the captain, knowing that he is preparing his own sergeants and corporals, will exercise much more care in the instruction of the men who by their character and service appear apt to become good non-commissioned officers, with real authority over their men. You will never see a company commander recommending a worthless corporal for a sergeancy with the sole object of getting rid of him, as sometimes happens when the system of changing newly promoted men from one unit to another is in force. Last of all, the difficulty previously referred to, that results from replacing almost all the lower non-commissioned officers when a class is released will be for the greater part avoided.*

The newly promoted men remaining in surroundings which are familiar to them, and well acquainted with the ideas of their captain, will have an infinitely easier apprenticeship than they would if they changed companies.

We may say, moreover, that we have requested and obtained several times, in the company which we had the honor of commanding, the promotion of privates of the company in place of lance corporals or sergeants; we have never remarked that they had less authority over the men than their comrades who came from other companies.

The objection may be raised that one does not find in all organizations the non-commissioned officers to properly carry on the instruction of candidates for corporals and sergeants, but this does not seem an insurmountable obstacle. It would doubtless result in more work, principally for the lieutenants and sergeants, but this is nothing when we consider the advantages that result from instruction carried on in the company, as compared with that given in platoons of instruction.

THE MEN.

As far as regards discipline, we have set forth almost all that we have to say concerning the men. We will have occasion to complete

*1. We may remark, that when necessary, it is always possible to get over this difficulty by transferring from another company such non-commissioned officers as would apparently be benefitted by a change.

2. What we have said of sergeants in this connection applies equally to corporals. Even if they are not all promoted sergeants on the departure of a class, the two or three that are left are usually of indifferent efficiency, or very low in rank.

our remarks later, in speaking of military and technical instruction. We wish here only to draw attention to the circumstances surrounding the recruit on joining.

A few days before the arrival of the recruits, the captain should assemble the non-commissioned officers of the company, in order to instruct them in regard to the way that he intends the recruits should be treated during the first days of their service with the colors.

The young men that we receive are almost always animated, on their arrival, with a desire to do well. Many of them feel an apprehension that paralyses the more timid, but this should not be taken for ill-will. Rigorous methods should therefore, except in entirely exceptional cases, be strictly forbidden; the non-commissioned officers, and particularly the corporals in command of squads, should rival one another in their zeal to teach the recruits the various details of their daily duty; at drill, the instructors should avoid harshness.

It is only after some time, when the recruits are accustomed to their new duties, that the faults really due to laziness or ill-will can be picked out; then only after one or two infractions have been overlooked, will it be proper to inflict a few slight punishments, which will usually suffice to bring the man back to the proper path.

A thing to be closely looked after is the assignment to fatigue duty. There are often, in the contingent assigned to a company, one or two recruits particularly lacking in intelligence. Although, in the beginning at least, they do not show ill-will in the performance of their duty, yet they find themselves picked out and taken in hand by the inferior non-commissioned officers. If care is not taken, these men will be placed on extra fatigue without the knowledge of their officers. Not having time to clean their own arms and equipments, they are punished for slovenliness. They become irritated and end by committing an act of insubordination, for which they are severely punished. Their morale is completely demoralized by the bad characters which they meet in the guard-house. They come out of the guard-house worse than they entered. From this time forward they are on the downward path, and perhaps nothing will stop them. The captain should therefore watch closely those men who are pointed out to him during the beginning of their service with the colors as being particularly difficult to train. In addition, he will do well to maintain a close supervision over fatigue duty, and frequently verify the fatigue details.

We therefore see that it is important that the captain should have

a personal knowledge of his recruits as soon as possible after they join.

For this purpose, immediately on their arrival he will look them over individually, will question them concerning their occupations in civil life, the condition of their family, etc., and will carefully enter all this information in a note-book, to which other information may be added later, as he knows them better. This book will furnish data that the company commander will find useful in many circumstances, such as applications for leaves of absence requested because the soldier must support his family, must be present at harvesting, etc.

This method of procedure is advantageous from another point of view. The recruit sees in it the interest that his captain takes in him, and from the beginning, does not look upon him as a stranger. This feeling stimulates his good-will and suppresses any feeling of apprehension that would interfere with his usefulness.

We may sum up these remarks, therefore, by stating that the duties of the captain should be exercised with great firmness, care, and kindness.

Details vary, and should vary with the chief who employs them as well as with the men to whom they are applied; and the method which succeeds in one case may not be suitable in another. We need not consider the three attributes above indicated as any the less necessary. The individual temperament of each captain will merely give predominance to one, without ever allowing him to suppress any of the three completely, if he desires to be sure of obtaining everywhere, and under all circumstances, the best possible result from the men the country has entrusted to him.

PART II.

INSTRUCTION.

All officers who, during the past few years, have been engaged in the instruction of Engineer troops, can testify how difficult, not to say how impossible, it sometimes is to give sufficient time to each of the different branches, both military and technical, which make up this instruction. Such a situation is due to several causes, to remove which is not within the sphere of the company commanders; they can only endeavor, by increased zeal and activity, to diminish the resulting ill effects.

However, on account of the extreme importance of this question, and although it is but indirectly related to the chief object of our paper, we have thought best to set forth certain considerations, which for the sake of clearness we have relegated to an appendix at the end of the present essay. We shall then confine ourselves in the following chapter to a few remarks, which seem to us likely to be of interest to our young comrades entrusted with the command of companies.

Since the point to be determined is the relative importance to be given to a branch of instruction or to some part of it, we must suppose that the company commanders are left free, as far as practicable, to regulate for themselves the employment of the time, under the supervision of the battalion commander. They will be governed by the two following conditions:

- (1) To finish the different parts of the course at the times fixed by the commanding officer.
- (2) To have the company ready for service as soon after the recruits have joined as is possible.

MILITARY INSTRUCTION.

DRILL REGULATIONS.

Existing orders provide that the infantry drill regulations apply to Engineer troops. It is quite certain however, that the latter, by reason

of the exigencies of their special instruction, cannot study or practice these regulations to the same extent as the arm for which they are more particularly intended. This besides, would be useless, for when in rare cases Engineers are employed as infantry, they are so employed under very special conditions which do not require in the Engineer soldier all the qualities that a good infantryman should possess.

For the details of this instruction we cannot do better than refer our comrades to the remarkable work of General Bonnal. Of course, we must take into consideration the fact that it is almost impossible for Engineer troops to engage in certain exercises, such as boxing and single-stick, which doubtless would be to their profit, but which must yield precedence to other branches of instruction much more important to the Engineer arm. However, we must avoid falling into exaggerated ideas, and considering everything in the way of gymnastics to be useless to the Engineer. Running and jumping, in particular, might be practiced to a greater extent than is usually the case.

The necessity of recurring frequently to individual instruction and to exercises in detail is perhaps greater in the Engineers than in any other arm. The goings and comings on the engineer drill ground, where it is impossible to exact absolute and continual correctness from men often burdened with the most various loads, rapidly gives to the men, if one does not look out for it, a habit of carelessness most prejudicial to the proper execution of movements when close formations are resumed. It is then indispensable, over and above the drills properly so called, to take the men in hand whenever the occasion arises.

FIELD DUTIES.

In the instruction in field exercises, the dispositions which must be taken by a company or smaller detachment to protect itself when acting alone, must frequently be studied. The case of the company employed as a unit in a complete system of outposts must indeed be regarded as quite abnormal, while a detachment of Engineers may often be required to provide for its own security in cantonment or bivouac, when with a special mission in view, it is employed in front or on the flank of the army, covered at most by a few small bodies of cavalry.

As regards the assembly, it is essential that the company be well trained to form in the minimum time without drum or bugle. A

company of Engineers is in camp in a locality also occupied by bodies of other arms. In the middle of the night its commander receives orders to set out immediately with his company to make a demolition, repair a crossing, etc. The company or the detachment must, in this case, be able to assemble rapidly, and to do this in silence so as to disturb in no way the rest of the other troops. To this end the sentinels will make themselves familiar with the quarters of the officers and the non-commissioned officers, so as to be able to waken them in the night without any groping about. The sergeants for their part, will know exactly where the chiefs of squads sleep, and the latter the sleeping places of their men. In drills of this nature the non-commissioned officers must be trained to arrive at the place of assembly with their half-sections or squads complete; and must be made to understand that a sergeant or corporal does not fully perform his duty in reporting to the captain the absence of such or such a man; he must first have done everything in his power to find the man. Whenever the company is required to pass the night out of barracks these measures will be strictly enforced, so that everyone may become thoroughly accustomed to them.

MARCHING.

The Engineers must be as well trained in marching as the infantry. They must always keep up with the infantry columns to which they are attached, and must sometimes be able to make twice the distance of an ordinary march, and still arrive in a condition to begin work.

This training cannot be obtained by means of marches performed once a week, or once a fortnight. Such exercises, so spaced, will only enable a previously trained company to keep in marching trim.

To accomplish the desired result, the company should make, consecutively—excepting necessary days of rest—eight or ten marches of increasing length. Two weeks may be given to this purpose, which will be utilized in the following manner:

FIRST WEEK.	SECOND WEEK.
Monday, 15 km. (9 miles.)	Monday, 22 km. (14 miles.)
Tuesday, 18 km. (11 miles.)	Tuesday, 25 km. (16 miles.)
Wednesday, rest.	Wednesday, 25 km. (16 miles.)
Thursday, 18 km. (11 miles.)	Thursday, rest.
Friday, 20 km. (12 miles.)	Friday, 30 km. (19 miles.)
Saturday, 22 km. (14 miles.)	Saturday, 35 km. (22 miles.)
Sunday, rest.	Sunday, resst.

These practice marches are preferably made at the end of winter, between the end of recruit instruction and the beginning of the season on the engineer drill-ground. At this time the young soldiers are under better control than at any other, and consequently no time is more favorable for accustoming the company to march in the best order compatible with the condition of the road and the state of the weather. This instruction is of the greatest importance, and it may be said that the appearance of a company on the march when it has just made 30 km. in bad weather or over a cut-up road, is one of the best criterions of its instruction, and even of its morale.

Taking this view, some officers advocate the use of the cadenced step; and in certain army corps the route step has been forbidden except in crossing fields. There has been considerable discussion on this question. While the cadenced step gives a fine appearance to the company on the march, and permits distances to be exactly maintained, yet it causes great fatigue to men of exceptional conformation, in all cases, and to the whole company on roads that are not perfectly smooth.

On the other hand, it will be observed that after a few consecutive marches the men at a route step will plant their feet—the right or left indifferently—at very nearly the same time. This no doubt results from the fact that, as they are accustomed to the cadenced step they have a tendency to plant their feet at the familiar tread of the company. As a consequence of this fact, each man, in order to march more easily, takes the step from the man in front of him. It may be said that after three or four consecutive marches, the company at route step will take a step that differs from the cadenced step only in the fact that it changes from section to section, and even in the sections themselves. These changes are the result of the small breaks caused by trifling irregularities in the road, on account of which one sees the men change step frequently when marching at the cadenced step.

We may therefore conclude that while there are objections to employing the cadenced step for the whole company, and imposing it on all the men, yet it is most advantageous to require the sections to march in cadence, with the understanding that the men who cannot conform to the step without fatigue shall be permitted to take the route step. Under these conditions the cadenced step, far from being an inconvenience to the soldier, facilitates the march, and permits as far as possible the preservation of the alignment by ranks and files, which must be observed whenever the state of the road does not require

that the men be allowed to choose at will the best paths, or the temperature does not necessitate increased intervals.

If the guide takes a regular step, and if he is careful not to increase the gait on descents, nor to decrease it on ascents, we reduce to a minimum the lengthening out of the column and the resulting fluctuations. These fluctuations are the most fatiguing element of a march over good roads in ordinary temperatures.

We must remark on the advisability of conducting these field exercises by company, and not by battalion, or by regiment, as is sometimes done. Except for the very rare cases when the three companies of an army corps are united for some special duty, the Engineer troops in campaign will operate by companies. It is essential that the captains become accustomed to acting on their own responsibility, without other instructions than the very general ones which will be received from their immediate superior authorities, and to regulating without hesitation a number of details which, in an infantry regiment, fall to the colonel or the major.

TARGET PRACTICE.

Without having the same importance as for infantry, target practice nevertheless constitutes one of the essential portions of the instruction of Engineer troops.

It must first be observed that in the instruction of the marksman, whether he be an Engineer or infantryman, two very distinct objects are contemplated:

1st. To teach the man skill at target practice,—in other words, to make him a good shot on the range.

2d. By frequently repeated drills, to so accustom him to the motions of loading and aiming, that they become instinctive, and are correctly executed even at short range, in spite of the excitement caused by the proximity of the enemy. It is certain, indeed, that as the distance between the hostile forces diminishes, the number of men who are really in condition to take careful aim becomes less and less; at the moment for decisive fire action, all that can be expected of them is to shoot into the crowd.

Is one justified then in saying that skill in target practice is useless? Certainly not. The infantry especially, in order to embarrass the service of the hostile batteries, may have need of carefully aimed fire, delivered from such a range that the excitement experienced by the best shots, who will be employed in such a case, will have

little effect on their marksmanship. Again, on the defensive, when fire is opened at long range, many men will be able to use the skill which they have acquired at target practice. But there is another reason which by itself would justify the importance usually attached to target practice, and this is that when a man shoots well, he acquires a confidence in his weapon that gives him confidence in himself.

As regards Engineer troops, it is to be observed that they will fire only when they are immediately threatened by the enemy, or in an emergency in default of infantry. It would seem that the Engineers will seldom fire at long ranges, such as 800 to 1,000 meters; but that their fire will be limited to short ranges.

It is therefore important, for the reasons given, to have them execute frequently the motions of loading and firing. To this end, every time that the company, for any reason whatever, falls in under arms, it should be put through the motions of a few volleys and of firing at will. In any case, these exercises, which take up very little time, should be conducted not less than three times per week.

As to target practice, the course laid down in the firing regulations, when properly applied, gives most of the men sufficient skill in this direction. However, it is usually found that some of the men are far from proficient after considerable practice. In some cases this results from defective vision, which must be corrected by suitable glasses. In others it is caused by the men jerking their shoulders, or fingers, as is indicated in Article IV of the firing regulations. The regulations prescribe the means for remedying such defects. But the most frequent cause for the poor shooting is that the arms or eyes of the men are fatigued before they have succeeded in directing the line of sight on the object. It is then impossible for them to take proper aim, try as they will, and in despair of success they pull the trigger almost at random. It is obvious what the result of such firing must be. For such men, the majority of the bad shots, there is a simple and effective remedy. It is a method used by many good shots to improve their aim. It consists merely in practicing a few minutes each day in aiming at any definite object, and holding the sights on the mark as long as possible. After a few days of this practice a great improvement will be noticed, even in men who previously could not hit the target at all.

In addition to the instruction of the men, there is the instruction of the officers. For the infantry at least, this is the more important of the two. It comprises the estimation of distances, the employment

of different kinds of fire, and the regulation and control of the firing. As Engineer troops will nearly always fire at short ranges, the instruction of Engineer officers in fire control is much simplified.

It must not be concluded, however, that this instruction may be completely neglected.

TECHNICAL INSTRUCTION.

As regards the details of instruction in sapping, mining, and bridge building, we have no remarks to make; we shall only say a few words on the fortification of the battle-field and on technical instruction in winter.

FORTIFICATION OF THE BATTLEFIELD.

Field works may be divided into two distinct classes; the first includes the more or less deliberate works, constructed in the mere presence of the enemy, in the organization of an important defensive position; the second includes those that must be executed with the utmost rapidity—sometimes in a few minutes—under the pressure of an imminent attack. Examples of the latter class are the organization of a point of support just occupied by the advance guard, or clearing a road for a column about to attack, etc.

The construction of works of the first class can always be accomplished by ordinary laborers, if they are relieved sufficiently often. Those of the second class, on the contrary, must be rapidly laid out, quickly commenced, and vigorously prosecuted. This can be accomplished only by specially trained troops.

In the first class of works, therefore, the working parties should be drawn from the infantry, except for those portions of the work for the execution of which the trained personnel or the special equipment of Engineer troops is necessary. Such a disposition is, moreover, usually unavoidable, for there are not enough Engineer troops to completely prepare the defensive positions for a large force. It would even appear preferable to spare the Engineers in such work, in order to avoid exhausting their energy before the battle begins, and to save them for the many tasks that fall to them after it has begun.

When the battle has commenced—and especially if the action is an offensive one—the infantry will have other things to do. They will be on the firing line, or massed for an attack, or maneuvering for their positions on the battlefield. The work that circumstances

from time to time require, in the course of the action, will fall almost exclusively on the Engineers. The companies with corps headquarters will be charged with the work of general importance to the army corps, such as the preparation of positions for a retreat, the destruction of important structures, etc. The divisional companies, closely accompanying the infantry, will have to fortify the points of support seized by the advance guard, and those which the infantry takes possession of in the preliminary combat; open roads to facilitate the movements of infantry and artillery; and execute the other work required on the field of battle.

Above all, it will be in case of an attack from an unexpected quarter that the greatest efforts will be required of the Engineer troops. If these are well trained and well commanded, they may in a few minutes organize a point of support which, weak as it may be, will perhaps enable the few men on the ground to gain the necessary time for bringing up the reserves. The captains must usually in such cases act on their own responsibility, without waiting orders, which if they come at all, will almost always come too late.

In order that this duty may be properly preformed, Engineer officers should be, as far as possible, informed of the intentions of the Commanding General. They must attentively follow the phases of the combat, and should be sufficiently versed in tactics to understand the situations that successively present themselves. They should possess the initiative to unhesitatingly adopt on their own responsibility the measures that the circumstances require. Finally they should have the professional training to make the best use in the least time of the resources at their disposal.

As regards the enlisted men, they must be well trained in earth work, both in order that they may do the work rapidly, and also that they may have the endurance to repeat this effort several times in the course of a day. It is very necessary that they be trained in rapidly commencing a field work. While an officer is tracing the work, the men should be receiving their tools. They are then rapidly posted and immediately begin work. They must be taught, in proper cases, to modify the regular profiles, so as to get the necessary earth with the least labor, the only dimension of the parapet that cannot be deviated from being the thickness of the parapet, which should not be reduced below 80 cm. (30 inches). Under this system of instruction, the results obtained with a well drilled company are surprising.

THE WINTER SEASON.

A few years ago, the interval between the date that the new soldier joined and the end of March, was devoted only to their military instruction. It now includes a number of technical drills (about two per week) intended to give the recruit some notion of the special duties of the arm, with a view to the possibilities of a mobilization in the spring. We thus have at our disposal thirty drills, and must determine what use to make of them.

The most apparent solution is to divide the time between the different branches of instruction in proportion to the total number of drills which each would require in the course of a year; in order to give each recruit some facility in performing all the tasks which may fall to an Engineer soldier in the course of a campaign.

But such a result appears very difficult to attain. It can scarcely be assumed, for example, that a young recruit who has attended two or three boat drills in the Arras bridge school, can fill his place in the anchor and boat detachment of a company throwing a ponton bridge over the Rhine, or even over a much less rapid stream.

It does not appear, however, that the attainment of this result is indispensable. The essential thing is to have all the companies constantly ready for mobilization—that is to say, in a condition to execute all the work that may fall to an Engineer company in the course of a campaign. If they cannot be constantly ready for mobilization, every effort should be made to reduce as far as possible the period during which they are not ready.

Let us take for example the ponton drill, and consider the case of a company whose recruits have two or three months service. We leave out the sergeants and corporals, who, if they have been well instructed, should be ready to perform all the duties of their grade.

Let us suppose that a mobilization occurs, and that the company mobilizes on its peace footing, 80 enlisted men, of whom 40 are recruits. What instruction should the latter have received in order that the company may build, under normal conditions, a bridge by successive pontons, without the assistance of the reservists?

Among the 40 old soldiers, the 20 best instructed in boat drill will be selected to form the anchor and boat detachment; the 20 others will compose the lashing detachment. The new soldiers should be competent to build the abutments, place the side rails, and, with a few auxiliaries, carry the balk and chess.

They may, besides, receive the necessary instruction for such work on any pond or water-course, the swiftness of the current having, in respect to this, no importance. It will likewise be advantageous to drill a certain number of them in lashing, in order to provide for a possible shortage in the old soldiers, who should in every case furnish the anchor and boat detachment complete.

Therefore, to confine ourselves to this one example, we may ask whether to prepare Engineer troops for war, it would not be better to teach each man thoroughly a portion only of the course of instruction, that he may fill a few specified positions, instead of instructing all the recruits uniformly during the winter season, with a view to giving them all a smattering of all their duties. The instruction of the men may be completed during the summer season, by taking them successively through all the duties.

Carrying out the same idea, it does not appear necessary to give to the new soldiers, during the winter, any information on the use of explosives. The company should always have a sufficient number of trained men to execute such work.

There are some drills, however, in which every enlisted man should be instructed. In the category, are the execution of earth work, and field fortification. Each enlisted man has a tool for such work, in the same way that each infantryman has his rifle, and each cavalryman his horse. That he may do this work properly, he must be drilled in the defensive organization of positions, the improvement of the natural features of the ground, in the construction of bridges over small streams and ditches, and in the execution of all the small tasks that fall to the Engineers on the field of battle. Above all, he must be well drilled in earth work.

What after all, distinguishes an Engineer company from any infantry company, as regards proficiency in the construction of field-works—this term being taken in its widest sense? Two very different things. First; special technical instruction, comprising branches in which the infantry are untrained. Second; training in earth-work, which enables them to do more work in a given time, and above all to keep on working for such long periods as could not be attained by a man who knows how to use his tool but is not exercised in their use.

The necessity for training all Engineer soldiers as skillful and vigorous excavators, is very apparent when one studies closely the

duties of Engineer troops on the battlefield, as we have endeavored to do in the case of field fortifications.

The recruits should, therefore, be drilled in earth-work at as early a date as is possible. Too much attention should not be paid to tracing and profiling, but as much digging as is possible should be done. One or two drills should be devoted to drill in rapidly commencing work.

To resume, there might be during the winter season two or three bridge drills under the conditions above indicated. The rest of the time would be given to earth-work and to field-works. As for all other tasks which would fall upon the Engineers in the field, it would seem that the company could always acquit itself satisfactorily, without requiring the recruits to serve except as combatants or workmen, if account is taken in regulating the details of instruction during the summer season of the vacancies annually produced by the expiration of enlistments.

APPENDIX.

We have alluded several times in the course of the article to the limited time available for the instruction of Engineer troops. Whatever the zeal and devotion of the officers, and however much the work required of the men, it is feared that this difficulty cannot be completely obviated.

Is it possible to apply a truly efficacious remedy to the situation, by attacking directly the causes of its existence?

The study of such a question so surpasses our ability that we would hesitate to attack it, if we did not consider it an imperative duty for every officer to contribute to the best of his power, however little those powers may be, to the progress which should be the constant law of our military organization.

Two principal causes tend to reduce the time available for instruction:

1st. The great number of special duty men which the companies furnish.

2d. The multiplicity of the duties of the arm.

The first of these causes has two equally regrettable results:

(a) By considerably reducing the number of men available for work and drill, it renders impossible the execution by company of certain drills that require a definite number of men; such as for example, ponton bridge construction. Recourse must be had to drill companies, a proceeding which furnishes a poor means for individual instruction, although it perfects, in some cases, the instruction of the organization.

(b) It reduces the length of time available for instruction. Almost all the men are on special duty at the end of the first year, some even as soon as their purely military instruction is completed.

It may truthfully be said, therefore, that there is only a single year, or rather ten months, available for the instruction of the men, and that this applies to men serving for three years as much as to those serving but one. All Engineer officers who have been on duty with Engineer regiments will appreciate the difficulties which are experienced in giving sufficient time to every part of the instruction in so short a period.

It does not seem that the situation can be sensibly modified, except by a radical change in our military organization. For several years, indeed, the inspectors-general, corps commanders, etc., have made an effort to reduce the number of clerks. The results obtained are certainly appreciable, but it must be admitted that nothing much remains to be done in this direction and that the small number of men which might perhaps be returned to the ranks, would scarcely work any change in the present state of affairs.

Let us then turn to the various duties of the arm.

These duties, numerous in the past, have recently been still further increased when the regiments of pontoniers were abolished, and the ponton work was given to the Engineers. The ponton drill appreciably reduces the time which can be given to other drills.

It may then be asked whether all the Engineer troops, except the railroad and balloon regiments, should be drilled in ponton building, or whether it would not be preferable to specialize some of the companies in this duty, as for example the corps companies, leaving the divisional and garrison companies to receive the same instruction as in the past.

Up to the present time the former system has been followed, except as far as concerns the assignment of companies on mobilization.

There has been no increase in the enlisted strength of the Engineer troops to correspond with the increase in their duties. As the number of companies remains about the same, it would appear most difficult to assign a sufficient number of them to the new work without encroaching on the other duties of the arm.

There are other difficulties to be confronted. The old Engineer garrisons—Arras, Grenoble, Montpellier, Versailles—were chosen at a time when there was no thought of ponton duty for this arm. The result is that the troops must be moved and sent to large streams, where the breadth and rapidity of current will permit them to perfect the instruction that can only be outlined at their garrisons.

Such a proceeding requires considerable time, to the detriment of other important branches, which cannot be neglected, as they constitute an essential part of the instruction of some companies. A case in point is the instruction of the fortress companies in saps and mines. The school of mines requires, especially, considerable time for its proper treatment, so that it is very difficult to make an accomplished miner and a well drilled pontonier out of the same Engineer soldier in three years.

At first sight specialization would seem to be a remedy for the situation. The specialization might be applied to the companies as a whole, or to the

soldiers in the company. The result would be the same—the number of subjects to be taught each soldier would be reduced, and more time could be devoted to instruction in the subjects taken up.

We propose, therefore, in the remainder of our remarks to consider whether this measure appears compatible with the proper preparation of Engineer troops for war, and in the case of the affirmative, whether it should be applied to individual men or to organizations, and under what conditions.

SAPS AND MINES.

Amongst the duties of Engineer troops, saps and mines were formerly the most important, as is shown by the name “sapper and miner.” At present the employment of these works has been considerably modified, and has sensibly diminished, at least in the regular and almost rigid forms formerly affected. Again, the greater part of the Engineer troops go now, on mobilization, to the field armies, so that the school of saps and mines has little by little lost the predominant place which it formerly held.

Are we to believe, as we sometimes hear, that the powerful effect of modern siege artillery will do away with the inch by inch attack in the future? It would seem likely that such will be the case when an antiquated, incomplete, and badly defended fortress is attacked, as will undoubtedly frequently happen. A fortress properly prepared and defended with a sufficient garrison will, on the contrary, be a very different proposition. By such fortresses we particularly understand those which are provided with strong works for defending the flanks and intervals, so constructed that they cannot be destroyed by distant artillery, and serviceable after the most violent bombardment.

Is the building of such a fortification possible in the era of modern artillery? Without entering into too lengthy a technical discussion, we will say merely that the affirmative appears certain, and that it is prudent to assume it in any case. The assailant who attacks such a fortress will have to choose between a blockade and a regular siege.

What will be the nature of the works of approach in the sieges of the future? It would appear that they fall into two entirely different classes.

Until a certain distance from the fortress has been reached—a distance which will vary according to circumstances—the work will be that of putting the positions successively occupied by the assailant in a state of defense. To this end the assailant will improve natural cover, and will construct deep trenches provided with overhead cover at frequent intervals. Concealed communications, and the various approaches, will be so designed as to mutually resist the sorties of the defender.

The construction of these works is not essentially different from the construction of powerful field fortifications on a battlefield. It will be mainly carried on by the infantry. The Engineer companies employed with them can apply to such works little of their instruction in sapping and still less of their instruction in mining.

When the assailant has arrived sufficiently close for an assault, he may find that his artillery has destroyed the flank defenses of the works and their intervals, and has breached a wide passage through the auxillary defenses, the wire fences, and all the artifices for checking the assailants under the fire of the defenders. If this fire then appears sufficiently weakened and demoralized, the assault may be delivered at once.

But the action of the artillery on the essential portions of the works of the fortress, and on the auxillary defenses, may not have been effective. In such case the assailant should push his approaches up to the main line of the defense, in order to finish with the mine the destruction commenced by the cannon.

The distance over which the assault may be delivered is very variable. It depends on many factors, the most important of which is the temper of the defenders. If the latter, in spite of the losses and privations of a protracted siege, have remained active and energetic, an assault delivered over a distance may lead to a disaster. If the defender can man his ruined parapets with a line of riflemen and can succeed in mounting on them a few rapid-fire guns, at the moment when the artillery of the attack has ceased firing to avoid injuring its own troops, the assailant may meet a bloody repulse. The history of former wars offers many instances of this kind, and such an occurrence is even more likely to happen in the future, on account of the increased efficiency of modern arms. It will be necessary to push the cover for the troops that are to make the assault as close as possible to their objective. The construction of the necessary approaches under the close fire of the defense, the destruction of concrete counterscarps and counterscarp galleries, and the underground warfare against the countermines of the enemy, if such should be undertaken, are surely operations requiring the utmost skill, and should be prepared for by a training that is not necessary in the construction of approaches at a distance from the defense.

If the attacker finds it necessary to push his works as close to the defender as this, the defender will usually endeavor to retard his opponent's progress by means of under-ground warfare, carried on with all the means of modern science.

It would seem, therefore, that for a siege pushed to its extremity, as

may sometimes occur, the employment of Engineer companies specially trained in such warfare will be necessary. But while it must be acknowledged that regular siege warfare must occasionally be carried on, yet such conflicts, if not exceptional, would at least be so unfrequent, that no very large number of Engineer companies need receive the special instruction pertaining to it. The present siege companies, with the corresponding reserve and territorial companies, should furnish sufficient men to defend our own forts, or to attack those of the enemy if the war should fortunately be waged in foreign territory.

It is a question, therefore, as to whether we should not divide the Engineer troops into siege and field companies, and specialize both their instruction and their duties.

Siege corps and garrisons of fortified places would include Engineer troops of both classes. The field Engineer troops would be assigned to the construction and care of communications in general, and, when necessary, to ponton bridges in particular. They would assist the siege companies in putting the fortress in a state of defense, and in the construction of advanced posts at a distance from the works.

With the exception of that portion of the instruction that relates to field operations, such as the employment of explosives in demolitions, and in breaching walls and auxiliary defenses, the school of mines would then be omitted from the instruction of the field companies. The little that can now be taught them appears in any event insufficient to fit them for any service except that of auxiliaries in the close attack or defense of a fortress. Again, such instruction would not seem necessary in the preparation of the outer line of resistance on the defensive, or in the construction of the distant approaches on the offensive.

On the other hand saps and mines would become the essential part of the instruction of the siege companies. This instruction would include field fortifications in addition, but bridges would be taught only to field companies.

BRIDGES.

As we have mentioned before, most of the posts of Engineer regiments are not suitable for completing their instruction in ponton-bridge building. It is, therefore, necessary to send each year a number of companies to a water-course of sufficient breadth and velocity of current, in order to complete their instruction.

The proper method for accomplishing this is doubtful, and of recent years there has been no uniformity as regards the river selected, or as to the troops designated for the duty.

Since we have lost the Rhine, the Rhone is the only one of our rivers which realizes the most favorable conditions for the instruction of pontoniers. With a very hard bottom offering little hold for anchors, great breadth, and a rapid current, it unites all the difficulties which must be overcome.

The ideal arrangement would be to send all the companies that might be assigned to ponton work to this river each year.

There would, however, be two objections to this arrangement, under the present conditions at least.

The first is the necessary expense. As the regiments at Arras, Versailles, and Angers are quartered in towns at a long distance from the Rhone, the expense of transporting the troops by rail would be heavy, and should be reduced to the lowest possible amount. The facilities for quartering troops on the banks of the Rhone are at present very limited, and new barracks must be constructed if all the companies are to be sent to this river for a sufficiently long period. This would involve a further expense that should be avoided if practicable.

The second objection is the time required for such instruction. This would decrease the number of drills that could be devoted to the other branches of instruction, and these latter could not be properly taught.

One solution which was employed, was to send to the Rhone a certain number of picked men only, forming a provisional company from each regiment. The remainder of the men finished their instruction at rivers relatively near the garrison, such as at Elbeuf on the Seine, for instance, for the Arras and Versailles regiments.

Although this procedure removed the first of the objections, it did not affect the second. For this reason, undoubtedly, a different system has been instituted. Under the new arrangement the Rhone only is utilized for completing the instruction of the men. Each regiment sends as many drill companies as it has battalions. The divisional and corps companies each furnish forty men to be specialized as pontoniers, the remainder being instructed as miners.*

If the relative advantages and disadvantages of these two methods be compared, it will be seen at once that the first provides instruction by

* This specialization is, however, only partial, since it relates only to the higher instruction. The enlisted men in the field companies receive at first an elementary instruction in both bridging and mining. We would call attention to the difficulties of properly carrying out the more detailed instruction of the miners of the field companies, under such conditions. After the companies have sent forty men to the bridge instruction there are few left for drill, as ordinarily it is very rarely that the company turns out as many as forty men for drill.

company, but this is not regarded as a very important point. By taking care that enough non-commissioned officers are sent to the Rhone, the company commanders would secure a sufficient number of chiefs of ponton who are skilled in maneuvering the boats in rapid water. But while the chiefs of ponton would be properly drilled for the construction of a bridge on such rivers as the Rhine or Rhone, it is to be feared that the crews would not have sufficient training to work quickly in such a rapid current.

The second solution, on the other hand, would seem to provide each company with a sufficient number of well trained men to form the anchor and boat detachments for work in any stream.

In this case, however, the instruction is not conducted by the captain, but by all the officers of the regiment in turn, for these officers take up this duty in succession. This is a very serious matter. Its gravity is apparent when we examine in detail the way in which the instruction is carried out.

The drill companies must supply the guard and fatigue details, and these absorb a considerable number of men. In addition there are the musicians, orderlies, telegraph operators, cooks, etc., who are never present at drill. These details reduce considerably the effective strength of the forty trained men that the bridge drills should give each company. Even the men available for duty are not uniformly instructed.

In addition to those detailed for duty with the drill companies, the other officers of the regiment spend about a week on the Rhone. During this time they are each called upon to take charge of two or three drills. As is proper, they are careful to see that the drills that they conduct are correctly executed. They direct the officers who are their assistants to select their non-commissioned officers accordingly. The inevitable result is that the chiefs of ponton who have shown skill and coolness at the beginning of the drill period are always assigned to these most difficult posts, which consequently impart the greater training, while the others are put at lashing side rails, constructing the abutments, and, above all, carrying balk and chess. The men in their turn are assigned to their duties according to their proficiency by the non-commissioned officers in charge of the detachments. Even if they so desired it would be hardly possible for the officers, who are being constantly changed, to establish such a rotation of duties that all the men would be put through each variety of work a few times.

The result is that the number of men in each company really instructed in building a ponton bridge in a rapid current is reduced from the total of forty which it should have, to twenty, fifteen, or even less. This is another instance of the unfortunate result of drilling men in special platoons, drill companies, or anywhere except in their own companies.

Neither of the two methods of instruction, successively adopted, appears to be quite satisfactory therefore, and it does not seem easy, with the present organization of Engineer troops, to find a solution that gives at once efficiency and economy. It is particularly hard to avoid the difficulty that arises from the fact that as the bridge drill is rightly considered of the highest importance, all the field companies have come to devote so long a time to it that the other branches of instruction are appreciably neglected.

May it not then be asked whether under such conditions, it would not be preferable to specialize a number of companies as ponton companies, even admitting that such a measure is incompatible with the duties that the Engineer companies, as now assigned to the army corps, are called upon to perform?

If one of the Engineer companies of an army corps is to be specialized as a ponton company, it would naturally be the corps company. Should not this company be able to execute alone all the duties connected with the bridge train?

Let us consider the most unfavorable case; that of an army corps marching on two parallel roads with a division of the bridge train in each column. The two bridges which might be required in such a case could be easily built by a platoon of the corps company, since the work would require at the most, for each of the bridges, but 97 men, of whom 28 (the balk and chess detachments) could be any auxiliaries whatever. If an advance guard bridge train marches at the head of each column, its service could easily be attended to by a section of the corps company.

In a word, the available strength of that company, supposing that it is reduced almost one-half, will be sufficient in every case to handle, under normal conditions, all the material of the bridge train pertaining to the army corps. The essential point is that it should be within reach. Now it is certain, by reason of the relative position which the units occupy in the columns, that the corps company will be able to reach the site of the bridge at least as quickly as the bridge train.

As far as the bridge train is concerned, therefore, it does not appear that there would be any difficulty to assigning the duty to the corps companies exclusively. Such companies alone would consequently receive the corresponding instruction.*

*In order to treat the question thoroughly, it would be necessary to discuss the influence of such a measure on the formation of the reserve, but a study of this nature would be out of place here. We may say merely that the sole consequence that should result from it would be the necessity of maintaining, in the composition of the reserve companies, some ratio between the respective number of the men who have served in the corps companies, and those coming from the divisionary companies. It does not seem that any difficulty would result from this.

The present condition of affairs was predicted by many officers, when the pontonier regiments were abolished, and there were some who advocated the reorganization of these regiments by collecting at Angers and at Avignon the third companies of the Engineer battalions.

It would seem that this last arrangement would be unfortunate from several points of view. As the corps companies would form separate regiments, and as they would be the only troops that were given ponton drill, they would gradually allow this portion of the work to monopolize their time, and would regard everything else as subservient to it. Under such conditions the divisional companies would have to perform all the duties in the army corps that fell to the Engineers before the pontoniers were abolished. They would be unable to cope with such a task. There is another point of great importance, which is that the Engineer troops attached to an army corps, should all belong to the same organization in time of peace.

Thus specialized, the corps companies would be the only ones that would have to be sent to the Rhone to complete their training, and this training could more advantageously be conducted, since separate detachments would no longer be grouped into drill companies, but the companies would remain intact under the command of their captain, who alone is responsible for the instruction of his company.

These companies would not be on this account mere ponton companies. The special instruction in bridge work, however completely carried out, would not absorb all the time outside of the purely military drills. Their program of instruction would include the use of explosives and the construction of field fortifications.

When the corps companies were not acting as pontoniers—and this would be the ordinary condition—they would be employed on the duties of constructing or demolishing lines of communication, and in fortifying the field of battle.*

The divisional companies would be trained only in the former Engineer bridge instruction, that is to say, they would be drilled, concurrently with the corps companies, in the construction of bridges, using material found on the spot.

*The specialization of the corps companies as companies of pontoniers, above outlined, could not be regarded as a return pure and simple to the old organization, for it would not present the two essential objections which were to be found in this latter, viz:

1st. All the engineer troops having charge of communications in the army corps were not united under the same commander.

2d. The pontonier company could be employed only in the construction of bridges.

FIELD FORTIFICATION.

The conclusion from the considerations in regard to saps, mines, and bridges above set forth, is that if the engineer companies are specialized as indicated, field fortifications would be taught to all the companies. It would merely be necessary to consider their assignment on mobilization, and regulate accordingly the details of the instruction given to each. Thus, for example, the division companies, having no longer to deal with saps, mines or the bridge equipage, could consequently devote considerable time to the works of the battlefield. Company commanders would employ this time in perfecting their men in excavation, in rapidly laying out field works, and particularly in fortifications on varied ground. These last drills are the only means of studying in detail the work of such varied nature as would fall to them on the battlefield, when acting in conjunction with the infantry.

We have set forth in this appendix the reasons for the specialization of Engineer troops.

We may have overlooked considerations that are opposed to the adoption of such a measure. So, leaving the decision to more competent and experienced authorities, let us be careful not to rashly draw final conclusions. Our object is attained if by submitting this work to our superiors and comrades, we have added a useful, though modest, contribution to the study of the most important question pertaining to the service to which we have the honor to belong—the preparation of Engineer troops for war.

POTEZ,

Capitaine breveté du génie.

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